GENERAL NOTES.

DR. E. B. FROST, director of Yerkes Observatory, has sailed for England and will probably remain in Europe till next spring. During his absence the duties of managing editor of the *Astrophysical Journal* have been assumed by Professor H. G. GALE.

Professor F. R. MOULTON, of the University of Chicago, has also sailed for Europe, where he will attend the International Congress of Mathematicians at Cambridge, England.

The Recovery of the Minor Planet MT.—So enormous is the labor involved in keeping track of the great amount of material presented by seven hundred asteroids that only the occasional discovery of an object like *Eros* seems to justify the work of searching for new objects in this class. The recently recovered asteroid *MT* promises to be second only to *Eros* in interest and importance; it has not yet received a name, but we hope that a definite designation will be given soon to this important object by its discoverer. On the subject of this asteroid and its recovery at Berkeley, Dr. CROMMELIN spoke as follows before the British Astronomical Association: "The circumstances recalled those of the discovery of *Ceres*. PIAZZI, on the first day of the nineteenth century, found the little planet, but, after observing it for three weeks, he fell ill, and the planet was lost in the sunlight. There was a great deal of difficulty in recovering it, but finally it was recovered by the aid of GAUSS's powerful analysis.

"The new planet *MT* was discovered on October 3d last by Dr. PALISA at Vienna. Though in opposition, it was then advancing pretty rapidly, instead of retrograding. It must therefore have a very remarkable orbit of great eccentricity; but, unfortunately, after it had been observed on October 3d and 4th, there was a full Moon, and bad weather prevailed for some time. When the weather became favorable again, all efforts to detect the planet on photographs failed, and it was feared that it was definitely lost.

"Within the last few weeks efforts had been made to get out the orbit, but the conditions for doing so were not favorable. It had seemed to him utterly impossible to get an orbit from three such close observations, but Messrs. HAYNES and PITMAN, two astronomers at Berkeley Observatory in California, set to work on Dr. LEUSCHNER'S powerful method of orbit-finding, and succeeded in getting three orbits not differing much from one another. With the aid of their ephemeris, Mr. DAVIDSON, of Greenwich, found images of the planet on three plates taken on October 11th. These had been overlooked before. It had also been found by ERNST and KAISER on a plate taken at Heidelberg on October 17th, so they now had material for getting a fairly good orbit. The perihelion distance was 1.15, the same as that of *Eros*. The planet passed perihelion at the end of August and was then near the Earth. It was rather tantalizing that it was not found at that time, as useful observations for parallax might have been made. They would have to wait a long time—perhaps thirteen years—before they got an equally favorable approach.

"It was quite possible that other photographs would be found —perhaps on the Harvard plates. But even if no others were found there was sufficient material to give a very fair approximation of the orbit. It might be just possible to observe the next opposition of March, 1913. The planet would then be in aphelion, and of magnitude 17 or 18. If it was observed then, they could predict its motion for an almost unlimited period. It must be an extremely tiny body—not much more than four or five miles in diameter—and too faint to be of much use for the solar parallax, but it would help in getting the Sun's distance in another way. The period did not differ much from 2.6 years, and the result was that five periods would be very close to thirteen years. Every thirteen years they would get one of these favorable approaches, and the Earth would produce a considerable perturbation in the planet's motion with a period of thirteen years. That would give the Earth's mass compared with the Sun's. In the case of *Eros*, the period of the great perturbation was forty years, which was a long time to wait.

From the data afforded by the positions of the asteroid found at Greenwich and Heidelberg, Mr. HAYNES has derived a more

accurate orbit of *MT* in *Lick Observatory Bulletin,* No. 216. From these elements the inclination of the orbit is nearly eleven degrees, the period 4.1 years, and the eccentricity has the unusually high value of 0.538.

It is announced that Dr. C. D. PERRINE, director of the Observatorio Nacional, Córdoba, Argentina, has secured funds from the Argentine Government to provide for the erection of a modern and fully equipped five-foot reflector. The field for such an instrument in the practically untouched southern skies is almost unlimited. We congratulate Dr. PERRINE on his success in securing an instrument of such power, and on the great opportunity afforded him to work with such an instrument in virgin territory.

Dr. S. ALBRECHT, formerly assistant astronomer in the Lick Observatory, and for the past two years first astronomer in the Observatorio Nacional at Córboda, has resigned and will return to the United States after making a tour of Europe. After September he may be addressed at 779 Forest Home Avenue, Milwaukee, Wisconsin.

Dr. E. A. FATH, formerly fellow at the Lick Observatory and for the past three years connected with the Carnegie Solar Observatory on Mount Wilson, has accepted the position of professor of astronomy at Beloit College, and will leave for his new post about September 1st.

Dr. J. D. MADDRILL, in charge of the International Latitude Station at Ukiah, California, has been appointed instructor in mathematics in the University of California. His successor as director of the station at Ukiah will be Mr. W. F. MEYER, who has been instructor in astronomy in the University of California during the past three years.

The Passing of an Historic Landmark.—All who have been connected with Lick Observatory in years past, or who have enjoyed brief sojourns as guests of the observatory, will remember with mingled feelings the large brick dormitory, which

forms so conspicuous a feature in all views of the observatory buildings. The first two directors of the Lick Observatory made their homes in this building; it was also the headquarters of the Senior Mess, and in it were quartered the bachelor members of the staff, and most of the observatory's guests. Known locally as "The Big Brick" or "Brickheim," so much space was wasted in the big structure in hallways and in dark and devious passage-ways that more than one guest has suggested "The Catacombs" as a more appropriate name. This building was so shaken by the earthquake of July 1, 1911, that it was of necessity condemned, and will be replaced by a somewhat smaller, but far more efficient building of reinforced concrete—fire, earthquake, and weather proof. This landmark has now been razed to its foundations and the lower part of the walls of the new structure will soon be up. The passing of the "Big Brick" was celebrated by a ball on the night of the Fourth of July as a characteristic Mount Hamilton affair, the dancing floor being the great platform formed by the lower floor of the old building.

A Mount Hamilton Wedding.—A ceremony of more than usual interest to the members of the colony on Mount Hamilton took place on June 17th in the marriage of Miss WYLDA AITKEN and Dr. REYNOLD K. YOUNG at the home of Dr. R. G. AITKEN, father of the bride. Miss AITKEN is a graduate of the University of California, and was till recently a computer on the Lick Observatory staff. Dr. YOUNG has been fellow at the Lick Observatory, securing his doctor's degree from the University of California in June. Dr. and Mrs. YOUNG left the same day for a visit to the groom's home in Canada, and will make their future home at the University of Kansas, where Dr. YOUNG has been appointed instructor in physics and astronomy.

At the recent commencement of the University of Virginia the degree of Ph. D. was conferred on Mr. GEORGE F. PADDOCK, who joins the Lick Observatory staff as assistant after five years of service as assistant and assistant astronomer with the D. O. MILLS Expedition at Santiago, Chile. The

subject of Dr. PADDOCK's thesis was "Some Adaptations and Criticisms of Spectroscopic Orbit Formulæ, with an Application to V *Eridani.*"

The scientific papers of WILLIAM HERSCHEL have at last been reprinted and made accessible to the public. The forty volumes of the *Philosophical Transactions* in which they have lain buried were within the reach of a very limited number, and the vast majority of his disciples—and what astronomer will not claim that title?—have had to content themselves with quotations or with HOLDEN's valuable abstract in the Smithsonian Report, 1880. The two somewhat massive volumes now issued contain a good deal more than the seventy *Philosophical Transactions* papers; there are twenty-five papers read before the Philosophical Society of Bath, hitherto quite unknown, concerned with subjects other than astronomy; there is a series of unpublished observations of Messier's Nebulæ and Clusters; there is a complete revision of the three catalogues of nebulæ by no less an authority than Dr. J. L. E. DREYER; and, finally, also from the pen of Dr. DREYER, there is a short account of Sir WILLIAM HERSCHEL's life and works. In compiling this biographical introduction, Dr. DREYER had at his disposal a large quantity of unpublished material, and his numerous quotations from the original Observing Journal, from the Record of the Polishing of Mirrors, and from the autobiographical memoranda, cannot fail to prove intensely interesting.

The two volumes can be obtained from Messrs. DULAU, 37 Soho Square, W., London, at the price of £2 10s.—*Journal of the British Astronomical Association,* May, 1912.

The Transvaal Observatory at Johannesburg, South Africa, has been renamed "The Union Observatory," and its activities will be mainly of an astronomical nature, but the first order meteorological observations will be continued, and the observatory will also collect seismological observations for the Union. All communications on astronomical subjects should in the future be directed to the Astronomer, Union Observatory, Johannesburg, Union of South Africa.

At the recent commencement of Lehigh University, the honorary degree of Doctor of Laws was conferred upon C. L. DOOLITTLE, professor of astronomer and director of the Flower Observatory of the University of Pennsylvania.

A Visit to Mount Wilson.—There seemed to be no good reason why an automobile accustomed to the road up Mount Hamilton, which had successfully negotiated the mountain passes between that spot and Los Angeles, should not attempt this rather difficult climb. The climb of nearly fifty-nine hundred feet proved a very hard one, however. The road has recently been somewhat improved by the Mount Wilson Hotel Association, and had been opened to automobile travel for the year only the day before, but the grade is very heavy in places and the road surface quite bad. So narrow is the road that in many places it would be difficult to pass a man on horseback, and at only three places is it possible for two machines to pass. It is accordingly necessary to telephone ahead of one's intentions to ascend or descend, in order that machines or teams going the other way may meet and pass at one of these three points. While some of the turns have been widened, six turns were met where it was necessary to back and go ahead a few times before the turn could be made. In comparison, the road up Mount Hamilton appeared to the driver to be a wide, straight boulevard. The ascent was successfully made, however, after a bad half-hour at the turn rightly named "The Devil's Elbow," just in time to sit down to a pleasant meal with a number of the observatory staff in the mess-room at "The Monastery," with one's only regret that the abused rear tires had apparently suffered more wear and tear in the gruelling ten miles' climb than they had done in the four hundred and fifty miles from Mount Hamilton to Los Angeles.

As it was about full moon, the five-foot was being used for stellar spectroscopy with a one-prism spectrograph. It was a pleasure to observe the ease of manipulation made possible with this instrument and its dome mechanism by electric motors; the slow motions were very conveniently worked by pressing buttons, and were all that could be desired as regards delicacy and responsiveness. The principle of saving the observer by

means of the motors in every possible way is an excellent one; one is apt to begrudge every ounce of physical exertion in the early morning hours, and it is a relief to find a motor to perform even such slight tasks as opening and closing the shutter or raising and lowering a wind-screen. The mechanical details of this fine instrument are worked out with a care and finish which will delight anyone who appreciates fine machine work.

The next morning, after watching the process of taking early morning photographs of the Sun with the Snow horizontal telescope and spectroheliograph, a visit was made to the great 150-foot tower telescope. This impressive structure quite dwarfs all other structures on the summit, making the 60-foot tower (not being used at present) and the dome of the five-foot reflector appear quite small in comparison. The ascent to the top of the tower is made by an electric elevator, which goes up in the open air outside the covered tube of the inner tower, and at the top of the tower one is just over six thousand feet above sea-level. No wind was blowing at the time, but the whole tower structure is said to be very rigid, and to suffer almost no vibration. Below, at the surface of the ground, is the mechanism of the upper end of the great spectrograph, a massive and beautifully designed piece of apparatus, on which falls an image of the Sun about seventeen inches in diameter, thrown down from the mirrors one hundred and fifty feet above. Here, as with the five-foot, all focal adjustments and slow motions, whether of the mirrors and lens one hundred and fifty feet above or of the grating eighty feet below, are accomplished by means of motors controlled by a few convenient buttons arranged in an arc under the hand of the observer. To reach the lower end of this spectrograph there is no elevator, but one must climb down to the bottom of the eighty-foot well on a spiral stairway.

A visit was paid as well to the observing station of the Smithsonian Institution, where daily bolometric records are made. This building is located near the "Monastery" on the edge of a cliff which has an almost sheer drop of one thousand feet. The shop, the laboratory, the power plant and storage battery house, the various buildings for the working force,

and the water-storage system would doubtless be of far less interest to the general reader than they were to one who could realize the difficulties involved in all construction on such a mountain summit. While the summit is distant from Pasadena only about half the distance from San Jose to Mount Hamilton, Mount Wilson is sixteen hundred feet higher and the grade far more difficult.

Most of the observers spend a week on the mountain, going down then to Pasadena for two or three weeks. One's judgment in such matters is apt to be colored by personal experience and preference, and there are doubtless some advantages in this method of planning astronomical work, but to the writer such a routine seems far less preferable than the system adopted at Mount Hamilton, where all observers and families remain always on the spot within easy reach of their instruments.

Some time was very pleasantly spent in the shops and laboratories at the general offices in Pasadena. The new administration and office building is nearing completion and will relieve the present rather crowded condition. All interest, for the casual observer at least, centers here in the grinding of the great 100-inch disk. This great disk was at first rejected because of bubbles and flaws, but because of the failure of all attempts to cast a more perfect disk, Professor RITCHIE is proceeding with the grinding. Over a ton and a half of glass has been removed from the rough disk, and it is rapidly being brought to a spherical shape. A full-size rubber is used with a very light pressure, the rubber resting on the disk with a pressure of only about 210 pounds, and the grinding is performed slowly for only six hours per day, to avoid temperature troubles. It is believed that all the bubbles and flaws can be avoided, though some pessimism is felt as to the ultimate success of the work from fear of internal strains and irregularities in the glass.

The tentative plan, not yet definitely decided upon, for the mounting of the 100-inch, involves a long polar axis of the English form supported by piers at each end, the weight being counterbalanced by large drums rotating in mercury, as with the five-foot, but in this case there will be two

drums, one at each end of the polar axis. The polar axis will be divided between the piers, and the telescope tube will swing in the middle of the divided polar axis. This plan has the disadvantage that it will be impossible to get much closer than 30° to the north pole. Either by having the declination axis offset above the split polar axis or by having the telescope tube on a very strong declination axis mounted at one side of the polar axis, as in the new Crossley mounting, the instrument could reach every part of the sky except a small area under the north pole. The great drums for the mercurial flotation are very expensive to construct, but have worked well with the five-foot. The skin friction in such great bearings as are necessary is very far from being a negligible quantity, however, even with all weight removed from the axis by the mercury floats, and the writer is rather enthusiastic as to the possibilities of anti-friction roller bearings for such great instruments. With rollers and sleeves hardened and ground on both axes, with cone roller thrust bearings at the lower end of the polar axis and on the declination axis, with sectors and driving-wheels similarly carried on rollers except when clamped in, he believes it quite possible to arrange a mounting for an instrument of one hundred tons or more which could be easily manipulated by hand.

Advances in modern astronomy and astrophysics are so intimately bound up to-day with the perfection of the instrumental equipment and with the ability to make a new piece of apparatus under the immediate supervision of the experimenter, that one must regard the beautifully equipped instrument shops at Pasadena as, in a sense, the most important part of the entire plant. In the making of new instruments and in the manufacture of special pieces of apparatus for experiments in connection with the varied activities of the Solar Observatory, this shop doubtless does more work in a month than do the instrument shops of other American observatories in a year. Without this foundation for its scientific work, the results in so many lines of astronomical and astrophysical work already secured by this great observatory would have been well-nigh impossible. H. D. C.

The scientific world will learn with sorrow of the death of JULES HENRI POINCARÉ, on July 17th. A fortnight ago he underwent a serious operation, which apparently was successful, and the doctors in attendance foresaw no complications, but the end came very suddenly. POINCARÉ was fifty-eight years of age. One of the very foremost figures in the field of mathematics and celestial mechanics, it is impossible, in the brief compass of this note, even to mention the more important of his achievements. It is hoped to have a brief account of the life and works of POINCARÉ in the next number of the Publications.